

# Information Bulletin

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**Title:** All Ventilation System Hazards Must Be Analyzed During Safety Basis Development

**Date:** July 7, 2006

**Identifier:** 2006-RL-HNF-0026

**Lessons Learned Summary:** A USQ Evaluation at the Plutonium Finishing Plant determined that unfiltered air stack release exceeded the Leak Path Factor credited in certain Safety Basis accident scenarios during HEPA filter change-out. Development of a Safety Basis requires that all ventilation system hazard conditions be described and analyzed, and the necessary controls implemented. This event could have been prevented had the filter room ventilation system bypass modes been analyzed when either the production era Safety Basis or the D&D Safety Basis was developed. After the Safety Basis was implemented, the filter room USQ could have been discovered sooner by curiosity about whether the doorway release path had been analyzed.

**Discussion of Activities:** A PFP USQ Evaluation of Building 234-5Z HEPA filter bypass conditions discusses two mechanisms by which unfiltered Zone 3 air could be released to the environment through the Building 234-5Z HEPA filter rooms. One is when the filter room door is open with an open pathway from Room 308 and Corridor 34 to the environment. The other is when the filter room is off-line with failed or untested HEPA filters - air still passes through the filter room via leakage through inlet and outlet dampers. The USQ Evaluation determined that unfiltered airflow out the stack exceeded the Leak Path Factor credited in certain Safety Basis accident scenarios.

These conditions do not meet the analysis assumptions that Zone 3 air exhausted from the facility passes through an Operable HEPA filter stage prior to release to environment, representing an increase in the consequences of analyzed accident scenarios.

**Analysis:** A USQ evaluation discovered two hazard conditions that were not analyzed during development of two safety bases documents. Damper leakage is a legacy condition, but the filter room bypass mechanisms (failure modes) were not identified by the developers of either the original Safety Basis or the D&D Safety Basis.

Along with the safety basis developers, safety basis reviewers also did not recognize the filter room leak path conditions. And the filter room failure modes were again not surfaced during a ventilation and HEPA filtration safety system review completed on 11/29/2005.

A blanket-flap was historically placed over the exhaust outlet during filter changes to reduce the room negative pressure from damper leakage (so people wouldn't be trapped inside in an emergency if the door closed), but the potential for a previously unanalyzed unfiltered release path was not recognized by facility personnel. The closed-door damper leakage condition was not previously recognized because the filter rooms have a long history of meeting the requirements for operability (not requiring failure analysis).

The long standing operation of the ventilation system, dating from 1949, led to an assumption that the physical configuration had been analyzed fully over the years and that no unrecognized hazards remained that required mitigative actions.

The development and review of identified controls in the Safety Basis is being enhanced through implementation of a formalized Control Decision Process for use in establishing consensus on the most effective controls prior to drafting or revising a Safety Basis.

**Recommendations:**

- When developing a Safety Basis ensure that all ventilation system hazard conditions are described and analyzed, and the necessary controls are implemented.
- After a Safety Basis is implemented, apply a questioning attitude about potential release paths.

**Cost Savings/Avoidance:** NA

**Work Function:** Engineering and Design - Nuclear, Maintenance - HVAC

**Hazards:** Environmental release

**Keywords:** USQ, unfiltered release, leak path factor

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**References:** EM-RL--PHMC-PFP-2006-0009, USQ Evaluation PFP 327-2006 "234-5Z Filter Room High Efficiency Particulate Air (HEPA) Filter Replacement May Allow Unfiltered Exhaust Release to Environment", Management Assessment PFP-NS-05-MA-001 "Documented Safety Analysis Implementation"

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